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Is Academic Pork on the Wane?

Page 7

CHEMICAL & ENGINEERING
NEWS

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JULY 18, 1988

News of the Week

■ **New report on biotechnology by the Office of Technology Assessment pointing to the promises, pitfalls of this industry was focus of Capitol Hill conference.** **Page 4**

■ **Pharmaceutical Manufacturers Association has identified 81 biotechnology-based products that are in clinical trials in the U.S., a surprisingly large number.** **Page 5**

■ **A number of chemists were among the 30 persons who received the National Medal of Science or the National Medal of Technology at a ceremony in Washington, D.C., last week.** **Page 5**

■ **U.S. team placed third at 20th International Chemistry Olympiad held in Helsinki earlier this month.** **Page 6**

■ **Amoco will build new carbon fiber plant based on polyacrylonitrile feedstock in response to law requiring DOD to obtain more than half its PAN-based carbon fiber from domestic sources.** **Page 6**

Business

Propylene supply is tightening as demand for the monomer's use in chemicals and polymers continues to grow at a strong rate. **Page 19**

Government

Bill aimed at preventing chemicals from being diverted from legitimate uses to the synthesis of illegal drugs has reached the House floor; attempt to end federal payments for banned pesticides was defeated in close House vote. **Page 22**

Science

Science should be made a central goal of space program, NRC panel urges; electronic bulletin board for organic chemists debuts; spectrum of dimethoxycarbene recorded. **Page 27**

Technology

Compressed air dryer based on membrane system is developed; batch synthesis of peptides achieved by new solid-phase process; surface-treated kaolin filler improves qualities of nylon. **Page 35**

Books

"The Breakthrough: The Race for the Superconductor" by Robert M. Hazen recounts author's personal involvement in the superconductor drama. **Page 40**

ACS News

ACS Board approves 160 new or continuing Petroleum Research Fund grants totaling $4,422,994. **Page 43**

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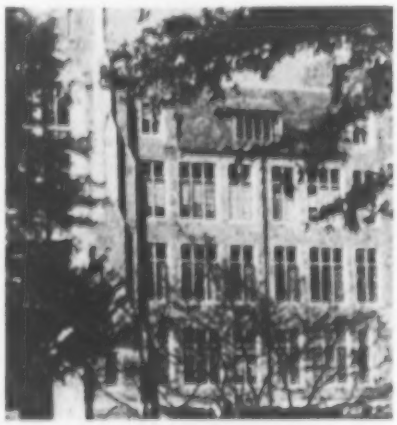

News Focus

Debate continues over pork-barrel science versus the peer review system: Which is best for science and the national interest? **Page 7**

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LETTERS

CHEMICAL SAFETY

Barium acetate pyrolysis

SIR: Following a minor explosion while pyrolyzing a mixture of barium acetate and mixed metal oxides, N. Fleischer (C&EN, April 11, page 2) proposed to eliminate the problem by purging the reaction tube, preferably with oxygen.

This would in fact be highly dangerous and would virtually guarantee a violent explosion. Pyrolysis of calcium acetate at 400 °C was used formerly to produce acetone industrially, and pyrolysis of 1 g of barium acetate could produce up to 0.22 g of acetone. As the lower explosive limit is 2.6% by volume in air, this amount could give some 5 to 10 L of explosive mixture at 350 °C.

In oxygen atmosphere both the lower explosive limit and autoignition temperature are greatly reduced, and extreme danger would be likely if oxygen purging were used. There is no substitute for inert gases for this purpose.

I have just learned of a violent explosion in oxygen-flask analysis, where the technician, "to ensure proper ignition," moistened the filter paper round the sample with just one drop (0.05 mL) of acetone before igniting the tail and insertion into the oxygen-filled flask. Fortunately the mesh guard retained the fragments. Human ingenuity for self-destruction knows no bounds!

L. Bretherick
Bridport, Dorset, U.K.

Well-grounded in chemistry

SIR: David E. Henrie recently bemoaned the reliance of chemists on such concepts as atoms and orbitals rather than physical properties observable by the human senses (C&EN, April 25, page 3). I would like to point out that the data we receive from our external spectrometers are just as valid as the data received by our internal instrumentation—eyes, ears, and so on. Furthermore, the innate model of reality that we carry around in our heads is not inherently more accurate than the models proposed by theoretical chemistry. As chemists, we are all too aware of how easy it is to be misled by the results from a single experiment. A brief consideration of optical illusions emphasizes that data from our biological instrumentation can be misleading as well.

It is irrelevant whether or not our descriptions of reality are, in fact, "true," as long as they enable us to accurately predict reality. Towards these ends, the quantum mechanical description of matter is by far the most successful treatment we have devised. A student well-grounded in the theory of chemistry is able to contribute much more to the advancement of the science than a student who has memorized the physical properties of a million or so compounds, most of which he or she will never come in contact with. The concepts of chemistry are the very essence of the science.

Henrie's disdain of theory leads him to conclude that attempting to understand brain activity in terms arising from that activity is akin to grabbing one's own waist and lifting oneself off the ground. If an understanding of the brain could arise only from a complete physical description of the action of each neuron, this might indeed be the case. A well-designed model, however, is like—if I may mutilate an analogy—a block and tackle, enabling us to lift our understanding beyond the mundane.

Clearly theory without observation is futile, but observation without a theoretical framework is useless. Theoretical considerations are very rightly a part of the chemistry curriculum at every level.

Timothy Hanks
Postdoctoral Research Associate
University of Minnesota

Environmental issue

SIR: I see that the Business Roundtable has blasted the "Clean Air Standards Attainment Act of 1987" (C&EN, March 14, page 5). Among other terrible consequences, they say it would eliminate up to 600,000 jobs, and harm U.S. competitiveness in international trade.

When an environmental issue, such as carcinogenicity of vinyl chloride or acid rain, is raised, the response of the chemical industry generally goes through four phases. The first phase is to deny categorically that a problem exists. The second is to say: "Well, there is a slight problem, but it is much less than people say." The next phase is to say: "Yes, there is a problem, but to correct the situation would be prohibitively expensive, will cause layoffs, and will severe-

Continued on page 59

Correction

• June 27, page 3: In Simon Bauer's letter, in the experiments cited, the unimolecular rate constants are pressure independent over the range 5 to 1100 torr, not 1100 to 1105.

Efforts To Stem Pork-Barrel Science Funding Likely To Be Unsuccessful

Use of Congressional spending bills to fund academic science projects at specific sites—thus bypassing the peer review system—is still being criticized by "have" institutions, praised by "have-not" schools

Lois R. Ember, C&EN Washington

If your college or university is part of what some call the academic old-boy network, you are likely to condemn it. If your institution is not, you probably think it's a dandy way to get federal funding for science projects. The "it" is earmarking—the Congressional practice of specifying in spending bills those campuses that are to receive funds for specific projects, thus bypassing traditional peer, now called merit, review.

The cognoscenti call it academic pork or pork-barrel science.

Pork barreling is a well-established prerogative of Congress, a Constitutional right even. Members of Congress have long used it to bring economic prosperity to their states or districts, usually in the form of highways and water projects. Until the early 1980s, academic institutions generally shied away from the practice.

But after many years of neglect, universities and colleges were facing a crisis: a crumbling infrastructure coupled with slim building reserves and few outside funding sources available to pay for renovating old research facilities or for building new ones. Suddenly pork barreling began to look attractive.

With hat in hand, academics began besieging Congress directly. Congressmen, ever mindful of the economic windfall scientific facilities could bring to their constituents, responded positively. A new era was inaugurated: postindustrial pork.

The irony of it all is that as more traditional pork barreling was leveling off or decreasing, academic pork was becoming a growth industry, though always remaining a small percentage of the total federal science budget. Over a four-year period, from 1982 to 1986, earmarked funds skyrocketed from around $2 million to $236 million, says Roy Meyers, communications director for Cassidy & Associates, a Washington, D.C., lobbying and consulting firm that has turned academic pork into an art form.

For several and varied reasons, close observers of the phenomenon believe that the coming fiscal year (1989) may mark the downturn in pork-barrel science. They may be wrong. Though fiscal 1989 budgets are yet to be finalized, a trend is becoming visible: As one budget spigot gets turned off, another gets turned on.

Academic institutions eager to get their share of the pie are increasingly turning to lobbyists who get paid handsome sums to scrutinize federal accounts for bountiful troughs. For the past five years or so, the Department of Energy's budget

Although there is a story that the phrase pork barrel dates back to plantation days in the Old South, William and Mary Morris in their book "Morris Dictionary of Word and Phrase Origins" (Harper & Row, 1977) offer a more prosaic explanation. According to the Morrises, the more probable, though less colorful, origin of pork barrel is that it is an expression that developed from pork, which had been in common slang use in the sense of graft or patronage since the carpetbagger days of the Reconstruction. As long ago as 1879 the Congressional Record ***reports use of the term: "St. Louis is going to have some of this pork indirectly." Later, when legislation such as the Rivers and Harbors Bill became an omnibus vehicle in which patronage plums were distributed by many Congressmen to their constituents, the analogy of packing all the pork into a single barrel became obvious. By 1913 "Fighting Bob" La Follette (Republican Senator from Wisconsin from 1906 to 1925) was writing about "pork-barrel legislation" and the chances are that the expression was in general use even before that time.***

Academics turn to Washington, D.C., lobbying firm for a helping hand

The truism, "It's not what you know, but who you know that counts," so aptly fits academic pork barreling—earmarking by Congress of considerable sums of money for specific research projects—that it's easy to forget that this Congressional prerogative has a long and vaunted history.

In the past it has been widely used to bring highways and water projects to home districts. But under an ever-tightening federal budget and a crumbling infrastructure, academic institutions are using this route to get new buildings and equipment.

Generally untutored in the mysterious ways of Washington, an increasing number of universities are turning to lobbyists for help in plotting strategy and in meeting key Congressional players. One lobbying and consulting firm leading academics through the legislative and political maze is Cassidy & Associates. This firm isn't the only game in town, but for its academic clients, it's been a successful one.

It's a reciprocal game, too. Universities have been good to the firm, allowing it to prosper over the past 13 years in the lee of the White House, just a few short blocks from its headquarters.

Cassidy communications director Roy Meyers will not discuss billings, though he does admit that the firm "is doing well." From a small start—three or four people and Tufts University as the only academic client—the firm now boasts a staff of 70 and a list of 80-some clients of which about 42 are colleges, universities, and medical centers.

After successfully getting Tufts president Jean Mayer his long-desired $21.1 million human nutrition research center, Cassidy's client list grew "almost by word of mouth," explains Meyers. Almost but not quite. Cassidy's cachet increased in 1984 after the firm successfully got several millions of dollars earmarked from Energy Department appropriations for two facilities: $5 million for a vitreous-state laboratory at Catholic University and another $5 million set aside for a national center for chemical research at Columbia University.

Even under the Graham-Rudman-Hollings cloud, the firm has been successful in getting facilities for its academic clients. And even as the prime trough—DOE's appropriations—is getting more difficult to tap, four out of six projects earmarked in DOE's fiscal 1989 funding were for universities represented by the firm. Each year its success rate, measured in funding dollars, has grown. "This year is about 10% higher than last year; it's just shifted to differ-

has been the prime target for pork-seeking lobbyists. But as the Energy Department's budget tightens, lobbyists are feasting on more obscure accounts—Treasury, Postal Service & General Government, and the Department of Agriculture's competitive grants program, for example.

Though neither evil nor illegal, pork barreling has precipitated raging debates within academic and government circles. Overlaid with subtle shadings, the issue takes on Byzantine complexities. Just about the only point of agreement is that academic research facilities are in dire straits. Independent and government studies have variously estimated the cost of renovation and new construction at $5 billion to $20 billion over the next decade or so.

Obviously this need will not easily be met. And the pressures that ignited the search for academic pork in the first place are not likely to disappear. Some academic institutions will continue to be urged by their trustees and faculty to seek Congressional favors. Members of Congress will not become immune from constituent pressure for help in revitalizing local economies.

Indeed, pork-barrel science is emblematic of the successful marketing of science and education. The academic community has long argued that economic viability and national competitiveness are the returns on investments in science and education.

Lawmakers considered the argument, not from a broad national competitiveness point of view, but from a more parochial perspective: "What can it do for my local or state economy?" The thriving high-technology economies of Route 128 around Boston and Silicon Valley in California convinced Congress of the argument's merits. And now, "Science is suffering from its own success," says Don I. Phillips, executive director of the National Academies' Government-University-Industry Research Roundtable.

Albert H. Teich, head of the American Association for the Advancement of Science's Office of Public Sector Programs, concurs with Phillips. "Pork barreling is a function of the increasing extent to which the political world views research as being important and desirable," Teich says. Many Congressmen simply want a piece of the action.

The action is there to be had. The federal government has not funded facilities construction in a major way since the 1960s and early 1970s when the government, primarily through the National Science Foundation, ran merit review facilities programs. Then, the thrust "was to expand the capacity to produce new scientists, not to replace outmoded or obsolete facilities," explains a knowledgeable House committee staffer.

Before and since that golden era of facilities funding, the traditional way of getting new buildings at private and public institutions has been through private gifts. Though this still remains the predominant route, building costs have escalated so much that some universities and colleges have turned to Congress for part or full support.

Campuses have never found it easy to get private donations for large-ticket equipment and instrument items. And as the accoutrements of science get more expensive, more academic institutions are going directly to Congress for such funding.

Certainly academic associations such as the Association of American Universities (AAU) don't quibble

ent subcommittees," says Gerald S. J. Cassidy, president of the firm.

Knowledgeable about the lay of the land, Cassidy uses the Congressional byways cleverly and well. He served a stint on Capitol Hill as general counsel to former Sen. George S. McGovern's Senate Select Committee on Nutrition & Human Needs (hence the link to nutritionist Jean Mayer, his first client). All of his lobbyists also come with Capitol Hill credentials, having served on key committees or as staffers for key Congressional members. He and his associates operate by cultivating the political kingpins, often with well-timed campaign contributions—to the tune of at least $50,000 annually.

His academic clients pay hefty fees for Cassidy's insider's track in the Congressional old-boy network, sometimes $500,000 yearly. But for those universities reaping the dividends, the fee is small potatoes. Says Boston University president John R. Silber, "Boston University would be far better off if it had used Cassidy & Associates five years earlier."

Cassidy & Associates hasn't done badly by Boston University. The firm helped the institution get federal funding to the tune of $27.6 million for its $125 million Metcalf Center for Science & Engineering.

To date, the firm has lobbied Congress only for money for bricks and mortar and equipment. Gerald Cassidy says his firm will "be sticking to facilities projects. We don't want to become involved in getting federal funding for research."

Cassidy insists that his activities, which he describes as government relations or public affairs representation, "allow institutions to develop a competitive capacity to do research." His firm levels the playing field, so to speak.

As Meyers explains, "We contend that there's an old-boy network whereby the top 20 research schools in the country get the lion's share of federal funding. We help put universities like Tufts and Boston in a position to play with the big boys."

Meyers bristles at the suggestion that pork barreling eventually will undermine the scientific enterprise because it bypasses the traditional peer, or merit, review system that has served it well for years. "It's not a matter of merit. It's a case of competing for some piece of the pie. The issue is money, not the principle, though proponents of peer review argue otherwise," he says.

"Any one of the projects we've been involved in is a viable, good research center. So the proof is in the pudding," Meyers adds.

with the need for such funding, only with the method of obtainment. They contend that pork-barrel spending is harmful to science because it compromises merit review, which has been science's dominating principle since the time of Francis Bacon. If continued and expanded, the scientific enterprise could crumple, they argue.

For the most part Congress has confined its earmarking activity to bricks-and-mortar projects and expensive equipment and instrumentation, but the fear is that it will stray into research funding. There is already some incursion there. Earmarks for the Defense Department are largely for research, not facilities.

As Donald N. Langenberg, chancellor of the University of Illinois, Chicago, explains, "The general concern is that if facilities' earmarking is sanctified by practice, there eventually will be no perceived need for science to sanctify research through the merit review process." As the system now operates, adds Teich, "the distribution of funds for research is made within the scientific community. By breaching this, you are opening up the door to political influence not only of awards for facilities but for operating grants."

In a study of the pork-barrel issue for AAU and other associations, Langenberg and colleagues contend that " 'Political' science too easily becomes mediocre science." They offer no support for this assertion, however.

"That's the slippery-slope argument," Cassidy spokesman Meyers charges. "You need to put more faith in Congress. It stills wants research to be peer reviewed," he contends.

Academic institutions that have received earmarked funds rightly say that there hasn't been traditional merit review of facilities since the early 1970s. Further, they insist, Congress is the ultimate arbiter, the ultimate peer so-to-speak. The colorful and feisty president of Boston University, John R. Silber, who leads the charge for institutions seeking Congressional earmarks, argues: "It is merit reviewed in the sense that the only committee of people in the U.S. qualified to assess when and where new facilities ought to be built—namely Congress—has made this review."

The early facilities funds "went to the 'haves,' the top 20 universities who have remained the top 20," Silber says. He contends that the traditional peer review system creates an old-boy network of "have" universities who do their mightiest to ensure that the "have nots" remain so. A source at an institution that advises Congress on science matters says there's been no conspiracy to favor specific research centers with federal funding. "It's the result of 10,000 different decisions. The process is too decentralized for a conspiracy," he claims.

Silber and M. Richard Rose, president of Rochester Institute of Technology, who also has been successful at getting funds from Congress, repeatedly cite a General Accounting Office report they say supports the existence of the old-boy network. The study shows that a large share (42%) of federal research funding goes to a concentrated and fairly stable group (20) of prestigious universities—all members of AAU—located primarily on the East and West Coasts.

AAU's president Robert M. Rosenzweig says, "It has never been the case that federal money is limited to a few universities. There are a few top receiving universities, but the universities change." In fact, GAO shows that there has been some movement within the

Members of Congress differ over the merits of academic pork barreling

Ever since President Reagan took office, his executive branch has been battling with Congress over the issue of pork barreling. As one Office of Management & Budget staffer tells C&EN, "Pork barreling is counterproductive in the extreme."

To end the practice, early this year OMB sent Congress a list of projects it considered "wasteful and unnecessary." Appropriations for these projects totaled $3 billion, a seemingly huge amount, except when compared with nearly $1 trillion in total federal outlays.

OMB got tripped up by its own list. Instead of showing that pork barreling dominates Congressional spending, the list indicates that for the most part pork barreling is on the decline. Except, that is, for academic pork targeted mainly for research facilities and equipment.

Although the practice started slowly and proceeded in a scatter-gun fashion, things changed around 1984. From that time on, members of Congress increasingly earmarked specific projects for specific academic institutions. For various reasons, the spending bills most often used by Congress were those of the departments of Energy and Defense. In fiscal 1988, earmarked funds in DOE's budget totaled about $139 million; DOD's corresponding figure was about $100 million.

Kennedy: richest colleges get richer

Because of budgetary constraints, academic pork barreling appears to have decreased in the fiscal 1989 appropriations for these two departments. What is not clear is whether this marks the beginning of a downward trend—or a one-year aberration.

What is very clear is that Congress does not speak with one voice on academic pork barreling. The fierce debates over the practice usually pivot on the issue of peer review: whether traditional peer review funnels federal research and development dollars to too few academic institutions.

In a recent radio debate, Sen. Edward M. Kennedy (D.-Mass.) said, "The system is biased in favor of elite institutions. . . . The richest colleges get richer, and the poor go fishing." Calling Congressional earmarking a "travesty,"

top 20 slots. Only 16 of the 20 have remained the same over a 17-year period. "Glaciers move faster," is Silber's quick retort.

Silber pleads for what he considers a more equitable distribution of resources, which he believes would be the likely outcome of pork-barrel spending. "Pork barreling creates new centers of excellence, new opportunities for scientific excellence," Silber insists. One of which is Silber's school. "Boston University didn't rank in the top 100 20 years ago. Our quality accelerated as we acquired the facilities to attract top scientists," he says.

An Office of Management & Budget staffer dismisses this argument. "Nobody believes that the net result of earmarking is to equalize excellence across the nation," she says.

While Silber argues that facilities attract top-notch people, others argue that puts the cart before the horse, that the game is played by attracting the right people first. "Some people are saying that the key part of research capacity is the people—the minds, the ideas. You want to put the investment in hardware where it will be best used, where the people resources are, where the best minds are," explains Ann Scanley, staff associate with the Research Roundtable.

Who's to say which side is correct? Certainly Silber's school is fortunate to be located in an area with a high concentration of talented people. In other parts of the country, less like Boston, attracting good people to a new facility may be more difficult.

Whether Silber is correct or not, he raises an important issue, one that is really the nub of the bristling debate over peer review science versus pork-barrel science. Which is better for the nation, for its economy and security? A system that seems to perpetuate a small coterie of excellent research institutes, or one that increases the ability of second-tier schools to conduct research and educate future scientists and move into the first rank?

Phillips of the Research Roundtable says, "In the current climate of restrained resources, establishing new centers as opposed to maintaining old ones should be a focused policy decision within the executive branch or Congress, not one based on a lot of disconnected decisions." He argues that "There needs to be a mechanism to review, in some collective way, the facilities' resources of science." Included in this review should be the criteria of geographic distribution and economic benefits. He adds, "The set of procedures and criteria appropriate for facilities should be different from individual investigator projects."

A lot of Phillips' thoughts have been codified in bills that would get the federal government back in the business of funding scientific research laboratories and educational facilities in a more organized way. These bills have been widely supported by the scientific community.

In some quarters that support arises from the belief that a federal facilities program will reduce the pressures on Congress to bring home the pork. According

Sen. Alan K. Simpson (R.-Wyo.) countered, "These [earmarked] projects don't even have to compete on any scientific basis for the funds. Other academically superior efforts simply go without."

Debating on the Senate floor, and picking up on Kennedy's theme, Sen. Dennis DeConcini (D.-Ariz.) said, "One look at the universities that received the research money shows beyond a shadow of doubt that unless your university is on the East or West Coast, you are picking up the crumbs, if anything, of any federal research dollars."

Calling pork barreling a "log-rolling approach," Sen. Jeff Bingaman (D.-N.M.) argued, "It is an issue of a small group of universities which happen to be located in the districts of powerful members of the Congress, . . . a group of universities represented by a high-powered Washington [lobbying firm], Cassidy & Associates, versus all the other institutions in the country . . . who would otherwise have a chance to receive these funds but have not signed up with Washington lobbyists to make their case."

Simpson: superior efforts go without

Though he accepts traditional peer review for research projects, Sen. Mark O. Hatfield (R.-Ore.) contends that "it is a static system that fails to take into account the related economic and social factors relevant to funding decisions for facilities."

Rep. Robert S. Walker (R.-Pa.) thinks otherwise. "A handful of people are making these decisions based on criteria that have absolutely nothing to do with science. . . . If we are to be competitive as a nation, in a world economy, [we have to] assure ourselves that we are first of all getting the very best science that's available to us," Walker says.

Walker doesn't sanction pork barreling but he doesn't lay the entire blame for the phenomenon at the feet of Congress. "It's the universities themselves that are sometimes the cause of [Congressional] interference by sidestepping the established process. They have to maintain more self-discipline than they have shown in the past," he advises.

to Robert L. Park, president of the American Physical Society, "Pork barreling will continue until there is some kind of federal program for facilities construction." His group along with AAU and other academic associations have vigorously lobbied for this program, partly to offset some of the antagonism they engendered on Capitol Hill.

With AAU president Rosenzweig as their chief spokesman, these groups went before one Congressional committee after another arguing that scientific peers, not Congress, should be making the decisions on who should get research funds and where buildings should be built. The more they testified, the more they infuriated Congress, says a close observer of science funding issues. "Congress began to view the Dupont Circle group [university associations located at that address in Washington, D.C.] as having unreconstructed arrogance," says Alvin W. Trivelpiece, now AAAS executive officer but formerly an assistant DOE secretary.

It got so bad that former Sen. Russell B. Long (D.-La.), debating the issue on the Senate floor a couple of years ago, asked: "When did we agree that the peers would cut the melon or decide who gets the money? . . . I do not recall that I ever agreed to that."

A committee staffer says Congress found the associations' attitude a "bit self-serving" in that they appeared to be arguing for the status quo. It would have been better for the academics "to appeal to Congressmen's understanding for the need to sustain a certain minimum level of peer-reviewed funding, and let Congress play games above that level," he contends.

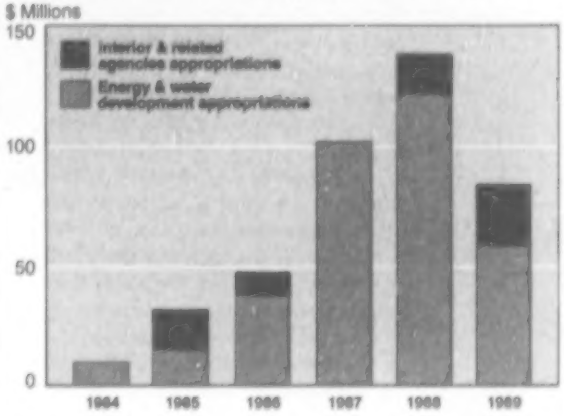
Congress wasn't the only group alienated, another Capitol Hill source points out. A year ago AAU asked its members to sign a moratorium against accepting pork-barrel funds. Ten of its 54 members refused to sign, some on general principle, others because they were already recipients of such funds.

Eventually, "It became clear that it was getting some people angry at us," says Rosenzweig. "There's no point in doing this if you can't win," he adds.

"It was more productive to use our energy and resources to seek a more constructive solution," Rosenzweig admits. So the associations regrouped and began a new two-part initiative. First, they would lobby for a new federal facilities program. Second, they would try to convince the Office of Management & Budget to change its indirect costs rules. These rules are used by academic institutions to write off facilities, supposedly to amass funds for maintenance and construction. Instead, a Capitol Hill source knowledgeable about science matters says, "They have used recovered, indirect costs for current operating costs, and have failed miserably to look to a period when they would be in need of buildings."

Universities retort that they have been severely and unfairly hampered by the indirect cost rules. The use charge, which was the only writeoff available for a long time, was predicated on an assumed 50-year life

Earmarked DOE funds increased more than 10-fold before dipping in fiscal 1989



Note: Fiscal years; interior & related agencies appropriations for fiscal 1989 are estimates based on actions to date.

for buildings. This doesn't allow for full recovery of costs, universities have long argued. In 1986 the White House Science Council agreed, and suggested a more realistic 20-year life for buildings.

Now universities can take a depreciation allowance on that portion of a nonfederally funded building used for federal research. This more advantageous method was not available to universities until recently. However, in switching from use charge to depreciation allowance, universities "incur a substantial one-time loss of recovery," says Robert Morenart, director of financial analysis and cost reimbursement for the University of Michigan.

Additionally, colleges and universities were scathed by the 1986 Tax Reform Act. "The law capped their ability to engage in tax-exempt bonding," AAU vice president John Crowley says. About 20 major institutions lost the ability to finance construction through tax-exempt bonds, he adds.

This leaves academic institutions more determined than ever to battle OMB to the end over indirect costs. They have been more successful, however, in convincing Congress of the need for a federal spending program for facilities and equipment.

At one time there were several facilities funding bills limping their way through the legislative maze. One was a section in the trade bill, which President Reagan vetoed. When that happened the Senate folded it into the National Science Foundation's fiscal 1989 authorization bill. Because the House already had a facilities provision in its NSF authorization bill, the issue could move forward.

But it did so only because of the persistent lobbying by AAU and other academic associations, says a well-placed Senate source. Joining this advocacy effort is a fairly new lobbying group called the Council on Research & Technology, or CORETECH, a coalition of research universities, companies, institutions, and trade associations.

CORETECH's executive director, Ken Kay, acknowledges Congress' right to earmark legislation. But he argues that "all members readily concede that having 525 mini-science advisers or mini-NSFs is not good public policy." Better to have a national research facilities program, he says. "It won't eliminate pork entirely, but it will create an environment in which the propensity to pork will diminish," Kay believes.

Only one stumbling block temporarily stood in the way of this lobbying effort: No one in the Administration or Congress could support a facilities bill in a tight budget. NSF director Erich Bloch repeatedly told Congress that his priorities were to support people and research first, equipment and instrumention second, and facilities last.

Still, the academic community's strong case for a facilities program impressed Congress, and a compromise was struck. There will be no money appropriated for it this year, but "Congress will establish a facilities program in the law this year and, perhaps, authorize it for 1990," the well-placed Senate source says.

The shape of the program is just becoming discernible. The provisions for it differ in the House and Senate versions of NSF's fiscal 1989 authorizing legislation, and a conference committee has yet to complete its work.

The House bill authorizes $85 million for facilities modernization in fiscal 1989, and $125 million in fiscal 1990. It sets aside 15% of the total each year for have-not universities, colleges, and research museums, those institutions that have received less than $10 million in total federal R&D funds over the two previous fiscal years. It also sets aside 10% of the total each year for institutions significantly serving minority students.

Congress limits DOE earmarks in fiscal 1989 to nine projects

Energy & Water Development Appropriations	Interior & Related Agencies Appropriations[a]
University of South Carolina, cancer research center, $8 million	**University of Oklahoma,** energy facility, $3.5 million
Louisiana State University, Center for Advanced Microstructure & Devices, $13 million	**Northwestern University,** materials science facility, $10 million
Oregon Health Science University, $12 million	**University of West Virginia,** National Research Center for Coal & Energy, $9 million
University of Arizona, Barry M. Goldwater Center for Science & Engineering, $10 million	
Drexel University, Center for Automated Technology, $5.5 million	
Loma Linda Medical Center, Proton Beam Cancer Treatment Facility, $11.1 million	

a Likely to be funded.

Defense Department set-asides are mainly for research projects

	$ Millions
FISCAL 1986 ($55.6 million)	
Wichita State University, aviation research	$ 5.0
University of Nevada, Las Vegas, computer research	3.5
University of Kansas, neurotoxin research	2.0
Iowa State University, research & related purposes	6.5
Northeastern University, engineering research & related purposes (in very high speed integrated circuits account)	13.5
Rochester Institute of Technology, microelectronic engineering & imaging sciences	11.1
Oregon Graduate Center, advanced semiconductor research	1.0
Oklahoma State University, research only	1.0
Syracuse University, CASE Center computer research project	12.0
FISCAL 1987 ($7.3 million)	
Mississippi State University, National Center for Physical Acoustics	5.5
Institute for Technology Development, center for advanced computation	1.8
FISCAL 1988 ($98.9 million)	
Louisiana State University, Pennington Biomedical Research Center for research on nutritional issues affecting Army personnel & dependents in peacetime	3.5
Mississippi State University, National Center for Physical Acoustics, to begin hiring qualified personnel	1.8
Unspecified recipient, to develop national bone marrow donor registry	2.1
Sandia National Laboratories, funding for Center for Compound Semiconductor Technology	10.0
Unspecified recipient, center for advanced compound & other semiconductor research	25.0
Oregon Graduate Center, to complete a program for development of semiconductor materials & devices	5.0
University of Scranton, to develop center to promote defense industry involvement in manpower training & education	7.0
Brookhaven National Laboratory & Sandia National Laboratories, to split funds, x-ray lithography research	15.0
Xavier University & Tulane University, to collaborate on developing technologies aimed at protecting health & environment from hazardous substances generated & used by DOD	16.5
Unspecified recipient in West Virginia, to design & assemble science & technology program	13.0

Source: Department of Defense

The Senate bill authorizes $80 million for fiscal 1989, and sets aside 10% for minority institutions. It has no provision for have-not institutions. But it does call for NSF to develop a comprehensive plan to scope out a facilities program and to define awards criteria, which it is to submit to Congress for approval by March 31, 1989. It authorizes $1 million for this purpose.

In ironing out the differences in the two bills, the conference committee is faced with answering many questions:

- Is there a need for NSF to draft a comprehensive plan?
- Should Congress delineate the criteria for the program, or should NSF?
- Should there be provisions for undergraduate schools?
- Should there be a set-aside for universities and colleges that are not in the top tier of recipients of federal R&D funds?
- Should there be a provision prohibiting an institution from dipping into two facilities accounts administered by, for instance, NSF and the National Institutes of Health? (NIH's authorization bill has language for funds to construct medical facilities.)

However these questions are answered, most observers believe that there probably will be money for facilities construction in the next fiscal budget. They also hazard a guess that the amount will be around $120 million.

There is hefty, though perhaps not sufficient, support for a two-part facilities program fashioned along the lines of the House bill. National Academy of Sciences president Frank Press says the first part "should be a national competition based on the quality of the proposal." In other words, funds would be allocated based on traditional merit review criteria. The second part, a set-aside, should consider proposals "based on other important criteria," he explains.

Sen. Mark O. Hatfield (R.-Ore.), who has earmarked funds for Oregon institutions, defines these other criteria. "The distribution of funds should take into account such factors as institutional need, the contribution the facility will make to economic growth and competitiveness, and the potential of the university to conduct critically needed research," he explains.

Hatfield voices the feelings of many in Congress when he says: "Peer review is appropriate for the award of funds for research projects. It may not be appropriate for awards of facilities funds."

However a facilities program is structured and whatever the criteria for awarding funds might be, there is another consideration: the eventual size of the program itself. That size hinges on the research capacity needs of the country and how much expansion the nation can afford.

Park of the American Physical Society says a study should be undertaken soon to define future needs. "My guess is that there is a need for new research capacity," he says. Another science watcher concurs: The people he speaks to believe that "when we get into the mid-1990s we will need expanded capacity."

On the other hand, AAU's Rosenzweig says, "I'm not for much expansion now because we don't have the resources. And I'm not sure we need to create a lot of new capacity to do the interesting things in science that there are to do."

Rosenzweig is expressing a sentiment that many academics believe but usually don't voice. As another observer of science matters explains, the general view is, "Unless the U.S. makes a commitment to increased

C&EN staff photo

funding for research, we really don't want to build more capacity."

The issue of future capacity should spark some interesting debates, but they may never become as heated as those that have swirled around peer review versus pork-barrel science. These latter debates have an interesting history.

Congress has been dipping into Department of Agriculture coffers since 1862 when land-grant colleges were established. More recently, even as members earmarked funds for specific scientific projects, sometimes to the tune of millions of dollars, there was nary a cry from academic associations. They assumed that land-grant colleges operated under different and, by now, entrenched rules.

Even when former Speaker of the House Thomas P. (Tip) O'Neill Jr. helped one Catholic university after another, it was dismissed as no big deal, merely his Catholic charities account, says former DOE official Trivelpiece. But, when the lobbying firm Cassidy & Associates convinced Rep. Charles B. Rangel (D.-N.Y.) to earmark $5 million of DOE 1984 funds for a chemistry research facility for Columbia University, the watershed event occurred, Trivelpiece believes.

Academic pork barreling took off. And the academic associations, led by AAU, began to squeal like stuck pigs.

"The scientific community assumes that earmarked money is taken out of their hide. I don't think it is," says Trivelpiece. As one who sat in the DOE hot seat at the height of earmarking, Trivelpiece is in a good position to comment. He says that for the most part he was successful in convincing Congress to add on money for earmarked projects instead of taking it from existing or planned DOE programs. He doubts whether Congress would have given DOE additional funding if it didn't earmark projects. And, he adds, "I can't say there was any scientific project at DOE that was not done as a result of a Congressional initiative to build a facility somewhere."

Department of Energy photo

Clockwise from left: Silber, Hatfield, Rosenzweig, Trivelpiece

DOE had to live with the political realities, but it didn't have to be happy about them. In fact, it infuriated the line-item managers. "If we had our druthers, we wouldn't be spending our money on some of these projects," says one DOE source who asks not to be named.

Because Congress never appropriated enough money to cover the full costs of DOE's basic research and the earmarked projects, "Earmarking decreased the funds available for ongoing basic energy research," says a former director in DOE's Office of Energy Research, Joel A. Snow, who is now associate vice president for research at the University of Chicago.

"Through the years, DOE has been the prime target for earmarking," says an analyst at the Congressional Research Service. "For the size of its budget, there's been surprisingly little earmarking in Department of Defense accounts," the analyst adds. However, most of the DOD set-asides are for research, not buildings as is the case with DOE, an OMB analyst explains.

A knowledgeable source who is still at DOE explains why Congress has so frequently targeted the Energy Department for "its adventurism in pork barrel." DOE's basic energy sciences is such a broad account that it can be used for a lot of things, he says. As would be expected, "Over time some earmarked projects got further away from DOE's mission," Snow adds. And this has presented management problems for the department.

From fiscal 1984 until this fiscal year, earmarked projects in DOE funds climbed from $10 million to $139 million. Earmarked funds for the upcoming fiscal year, 1989, are likely to drop dramatically to about $82 million.

Because of the budget summitry last year, the energy appropriations chairmen struck a deal: no new construction starts in fiscal 1989. As one Senate staffer put it: "People who weren't at the trough last year don't get anything this year." All the funded projects are second-year projects.

This downward trend may hold for DOE. As a House source close to the issue explains, DOE is facing a multi-billion dollar cleanup program at its nuclear fuels production facilities. The department also eventually wants to fund the expensive Superconducting Super Collider project. The number of projects vital to DOE in the future "will tend to squeeze out extra things like bricks-and-mortar earmarked money," this source says.

But this squeeze on DOE will probably force lobbyists and Congressmen to look at other accounts. Indeed, there is evidence that they already have.

Congress struck the Agriculture Department's small competitive grants program, the primary source of peer-reviewed funding for plant and animal sciences. In the past, Congress would specify which broad categories of research it wanted conducted, but it never named specific universities or specific projects. With the fiscal 1989 appropriations, this may change.

About 20% of the $41 million the Senate appropriated for the competitive grants program is earmarked for four projects. A food safety consortium of four universities is to receive $2 million for research on microbial and chemical contamination of meat. The Midwest Plant Biotechnology Consortium (16 universities and 30-some companies) is to receive $2.5 million for plant sciences research. The National Center for Alternative Pest Control at the University of Arkansas is to receive $2 million to research alternative pest control. And finally, the University of Iowa, Iowa State University, and the city of Cedar Rapids are to receive $1.75 million for waste-treatment research.

The House appropriation for the competitive grants program totals only $29 million and contains one earmarked project—$2.5 million to the Michigan Biotechnology Institute to develop new products and chemicals from agricultural raw materials. A conference on the two bills is scheduled for the end of the month, and it is possible that some or all of the earmarked projects will be deleted.

Rep. George E. Brown Jr. (D.-Calif.) is incensed by this incursion into the Agriculture Department's peer review program. Earmarking, he says, "tends to place scientific considerations secondary to the ability of a given institution to lobby Congress."

The lobbying firm Cassidy & Associates has turned to Treasury, Postal Service & General Government appropriations to help three clients get facilities money. The University of Hawaii, Loyola College of Maryland, and the University of Utah are among six universities slated for Congressional largesse, if the projects survive conference.

Although one Capitol Hill science watcher believes that "the worst of the pork barreling is over," it may be too early to say. A complete scan of 1989 authorization and appropriations bills is likely to pick up many earmarks in obscure accounts. Unfortunately, the total may never be known. It is such a daunting task that the Congressional Research Service, which has tracked such earmarks since the 96th Congress, has just given up on the effort.

The pressure on members of Congress to bring jobs and prosperity home to local economies is likely to continue. Lobbyists are not going to give up lucrative business because some academics find pork barreling unwholesome.

Though a national facilities program may ease the pressures somewhat, it has to be funded to do so. And the recent history on facilities funding is not promising.

A few years back Congress approved a $20 million-a-year facilities program to be administered on a competitive basis by the Agriculture Department. Congress has yet to fund it.

So what has been a triumph for science may in the end be its despair. "The good news is that Congress finally takes a sincere interest in science and technology. The bad news is that Congress finally takes a sincere interest in science and technology," quips Trivelpiece. □

Lobbyists target 1989 Treasury, Postal Service & General Government funds

	$ Millions
SENATE APPROPRIATIONS	
University of New Mexico, Center for Southwest Research	$ 5
University of Idaho, Center for Strategic Research & Environmental Laboratory ($3 million in fiscal 1990)	4
University of Hawaii, Manoa,[a] Strategic Ocean Minerals Research Facility	10
Loyola College, Maryland,[a] Center for Advanced Information & Resource Management Studies	4
University of Utah,[a] Biomedical Polymers Center	9
HOUSE APPROPRIATIONS	
University of Hawaii,[a] Strategic Ocean Minerals Research Facility	15
University of Texas, El Paso, study and facilitate development of strategic materials technologies among industries	3

Note: Bills reported out of House and Senate; no conference scheduled as of July 8.
a Clients of Cassidy & Associates, Washington, D.C., lobbying firm.